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The Aerovox Research Worker

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R-F Transistors

Their Characteristics and Applications

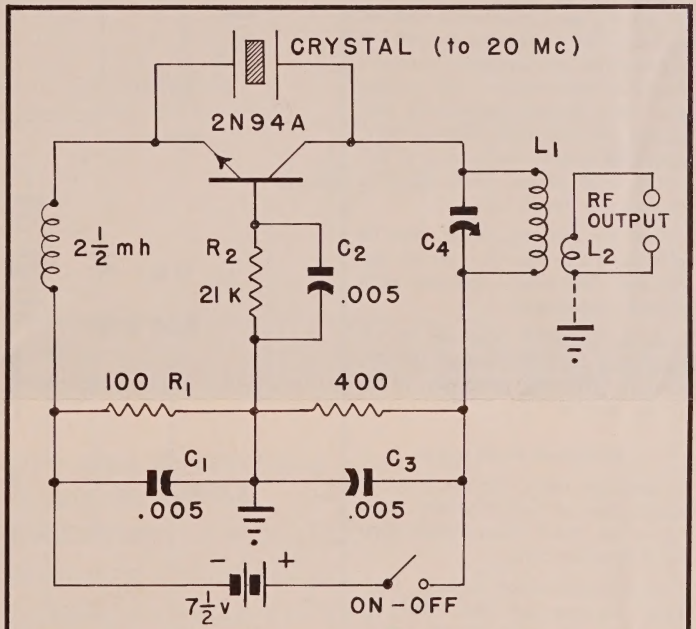
Part: 2

By the Engineering Department, Aerovox Corporation

High-Frequency Crystal Oscillator. Figure 4 shows the circuit of a general-purpose crystal oscillator for use at crystal frequencies up to 20 megacycles. This circuit was designed for the 2N94A transistor. The CK762 also will operate in this setup but the battery terminals must be reversed for the latter type. Emitter bias is developed across resistor R_1, and collector bias across R_3.

The circuit is a ready oscillator and delivers approximately 10 milliwatts r-f output. The tuned-circuit constants, C_4 and L_1, are chosen for resonance at the crystal frequency. The low-impedance pickup coil, L_2, consists of 2 or 3 turns wound close to the lower end of L_1.

Superheterodyne Radio Broadcast Receiver. A completely-transistorized broadcast superhet receiver circuit is shown in Figure 5. In this arrangement, the original Raytheon design has been adapted for use of transistor-type i-f transformers, oscillator coil, loop antenna, and audio transformers recently made available commercially.



GENERAL-PURPOSE H-F CRYSTAL OSCILLATOR

FIGURE 4

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The receiver uses CK761 transistors in the converter and oscillator stages (V_1 and V_8, respectively), CK760's (V_2 and V_3) in the i-f channel, a CK760 (V_4) as a power-type 2nd detector, a CK721 low-frequency transistor (V_5) as the audio driver, and two CK722's (V_6 and V_7) in the pushpull class-B audio output stage. Power output is 100 milliwatts or better. A single 6-volt battery (four Size-D flashlight cells connected in series) is used, with a tap at 3 volts.

The subminiature i-f transformers (T_1, T_2, and T_3) and the oscillator coil (T_6) are slug-tuned. The main tuning control is the 2-gang 365-uufd variable capacitor. The variable capacitors, C_t, shunting each section of the tuning capacitor are the small trimmers built into the latter.

Since the i-f amplifier transistors, V_2 and V_3, are connected as common emitters, the i-f channel basically is regenerative and oscillation normally would be encountered. To circumvent this, 30-uufd neutralizing capacitors are connected between these stages, as shown. The i-f gain is better than 30 db per stage including transformer losses.

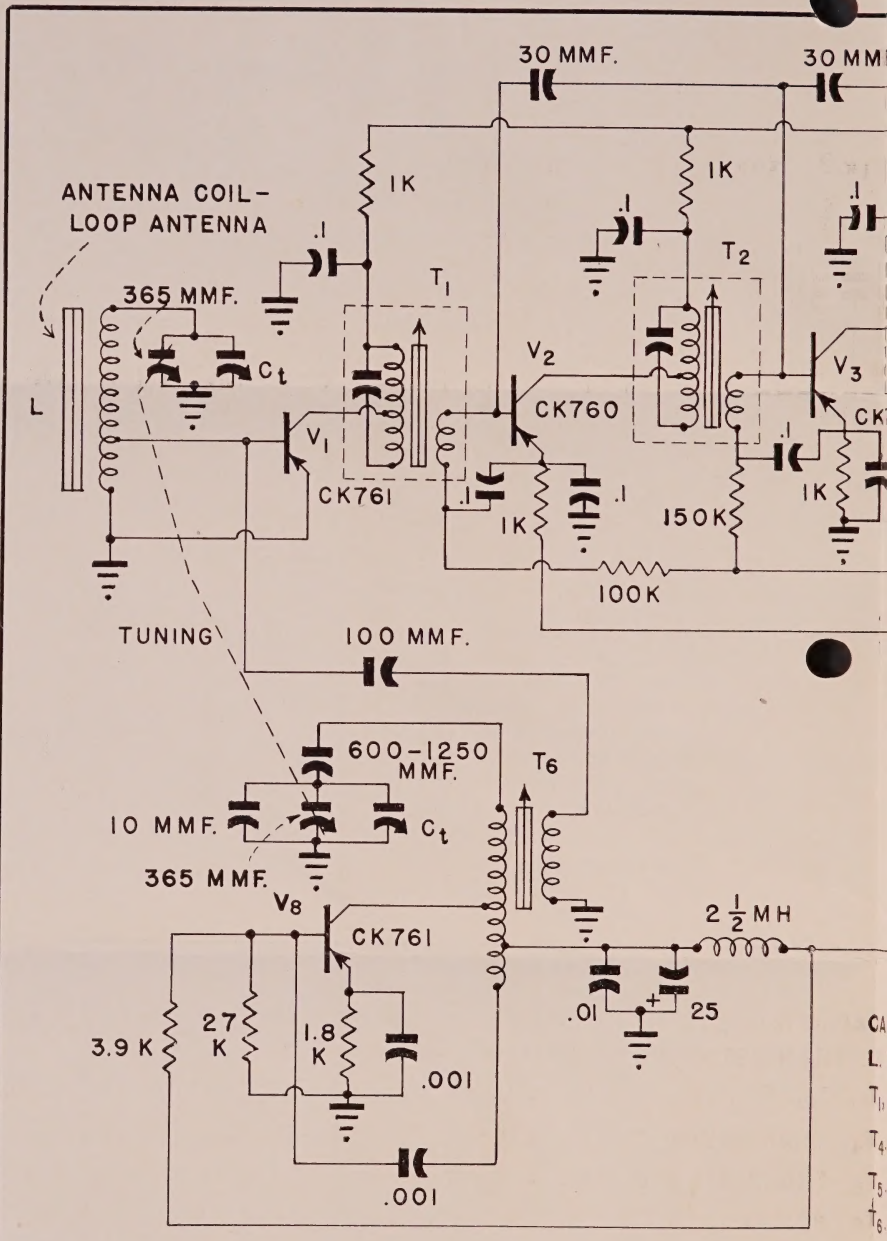
Bias for both of the i-f stages is obtained via avc action from the 2nd detector, V_4, which operates as a class-B power type.

Audio quality is improved by degenerative feedback through the 18K resistor from the secondary of T_5 to the base of V_5.

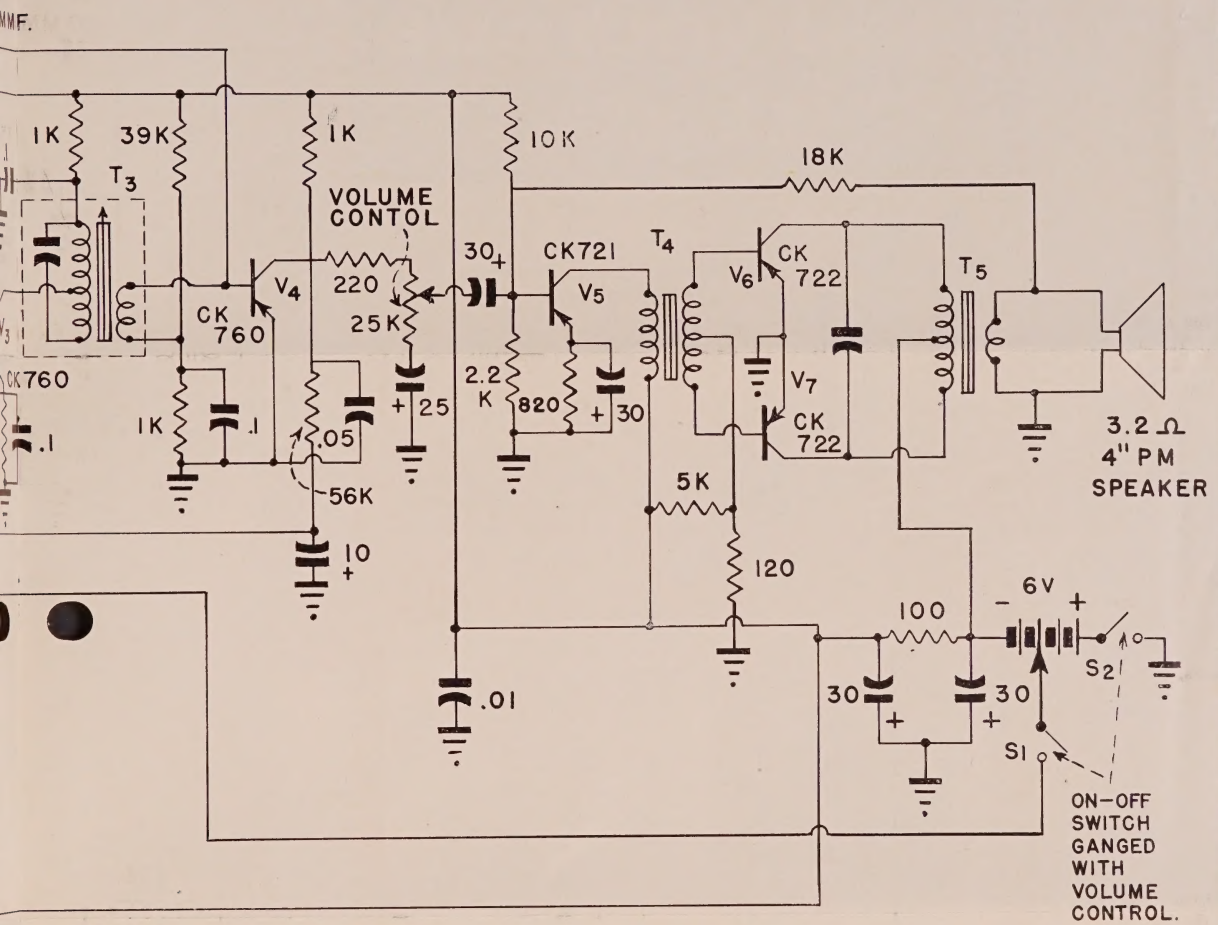
Additional Applications

There are many possible, practical applications of high-frequency transistors for which there is not room for discussion here.

Such applications include high-speed flip-flops and other electronic switches and multivibrators, video amplifiers, signal monitors and meters especially the heterodyne type, beat-frequency oscillators, portable short-range transmitters, radio control transmitters and receivers, regenerative and superregenerative receivers, pulse forming circuits, and clipping circuits.



COMPLETELY-TRANSISTORIZE



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T_1, T_2, T_3. 455 Kc TRANSISTOR I. F. TRANSFORMER – J. W. MILLER NO. 2041.

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T_5. TRANSISTOR CLASS–B OUTPUT TRANSFORMER – TRIAD TY–47X.

T_6. 455 Kc TRANSISTOR OSCILLATOR COIL – J. W. MILLER NO. 2020.

ZED SUPERHETERODYNE BROADCAST RECEIVER

FIGURE 5

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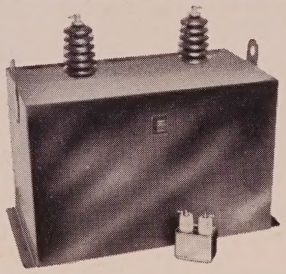

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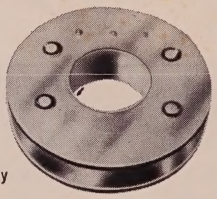

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